

**GCSE
MATHEMATICS
8300/3F**

Foundation Tier

Paper 3 Calculator

Shadow paper based on June 2023 paper

Mark scheme

June 2023

Second Half

Version: 1.0

Q	Answer	Mark	Comments										
17	2 correct matches	B2	B1 for 1 correct match										
	Additional Guidance												
	Mark intention												
	Matching to more than one box on the right is choice for that match												
	<table><tr><th>Name</th><th>Sequence</th></tr><tr><td>Quadratic sequence</td><td>10, 7, 4, 1, −2...</td></tr><tr><td>Linear sequence</td><td>7, 16, 27, 40, 55</td></tr><tr><td>Fibonacci-type sequence</td><td>1, 5, 9, 11, 13</td></tr><tr><td></td><td>2, 5, 7, 12, 19, 31</td></tr></table>			Name	Sequence	Quadratic sequence	10, 7, 4, 1, −2...	Linear sequence	7, 16, 27, 40, 55	Fibonacci-type sequence	1, 5, 9, 11, 13		2, 5, 7, 12, 19, 31
	Name	Sequence											
Quadratic sequence	10, 7, 4, 1, −2...												
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Fibonacci-type sequence	1, 5, 9, 11, 13												
	2, 5, 7, 12, 19, 31												

Q	Answer	Mark	Comments
18	$1 + 0.02$ or 1.02 or $0.02 \times 357\ 000$ or 7140 or $364\ 140$	M1	oe eg $1 + \frac{2}{100}$ 357 860 implies M1
	Full method for exactly 6 compounded percentage calculations with their multiplier	M1	oe eg $357\ 000 \times \text{their } 1.02^6$
	[402 000, 403 000] with M2 awarded	A1	
	Additional Guidance		
	402039.(98...) or 402040 with M2 awarded		M1M1A1
	Answer 399 840 from 7140×6		M1M0A0
	Answer 399 840 without either 42 840 shown or M2 awarded		M0M0A0
	Intermediate values for separate calculations are 364 140, 371 442.(...), 378 851.(...), 386 428.(...), 394 156.(...)		

Q	Answer	Mark	Comments
19	No ticked and correct reason or correct evaluation of the surface areas for any numerical or algebraic values or correct ratio of the surface areas	B2	eg 40 faces are hidden B1 No ticked
	Additional Guidance		
	Ignore irrelevant reasons or evaluations alongside a correct reason or evaluation, unless contradictory		
	“No” may be implied by a correct reason		
	Accept reasoning that uses A as a cube		
	No ticked and		
	A has 6, B has 32 (condone sides for faces)		B2
	A has 3, B has 16		B2
	A has 6 sides, on B each cube only has 3 or 2		B2
	Ratio is 3 : 16 (accept equivalent ratios)		B2
	The inside is missing (or covered)		B2
	When they are put together you lose two faces		B2
	Some of the faces are covered		B2
	You cannot see some sides because they are stacked together		B2
	Yes ticked or Cannot tell ticked		B0

Q	Answer	Mark	Comments											
20(a)	12 and −3 in the correct positions	B2	B1 12 or −3 in the correct position											
	Additional Guidance													
	<table><tr><td>x</td><td>−3</td><td>−2</td><td>−1</td><td>0</td><td>1</td></tr><tr><td>y</td><td>21</td><td>12</td><td>5</td><td>0</td><td>−3</td></tr></table>			x	−3	−2	−1	0	1	y	21	12	5	0
x	−3	−2	−1	0	1									
y	21	12	5	0	−3									

Q	Answer	Mark	Comments
20(b)	Plots at least three points correctly	M1	correct or ft their table in (a) $\pm \frac{1}{2}$ small square points may be implied by graph passing through them
	Correct graph drawn through the five correct points	A1	$\pm \frac{1}{2}$ small square smooth (quadratic) curve
	Additional Guidance		
	Correct graph drawn without plotting the correct points	M1A1	
	Ignore any extra points plotted		
	Ignore any part of graph drawn for $x < -3$ or $x > 1$		
	Ruled straight lines	A0	

Q	Answer	Mark	Comments
21	Alternative method 1		
	5625 ÷ (2 + 7) or 5625 ÷ 9 or 625	M1	oe
	their 625 × 7 or 4375 or their 625 × 2 or 1250 or their 625 ÷ 5 or 125	M1dep	oe 5625 × $\frac{7}{9}$ is M2 5625 × $\frac{2}{9}$ is M2 5625 ÷ 45 is M2
	their 4375 ÷ 5 or (5625 – their 1250) ÷ 5 or their 125 × 7 or 875	M1dep	oe dep on M2
	875 and Yes	A1	accept 875 > 870
	Alternative method 2		
	870 × 5 or 4350	M1	
	5625 ÷ (2 + 7) or 5625 ÷ 9 or 625	M1	oe
	their 625 × 7 or 4375 or their 625 × 2 or 1250	M1dep	oe dep on 2nd M 5625 × $\frac{7}{9}$ is M2 5625 × $\frac{2}{9}$ is M2
	4350 and 4375 and Yes	A1	

Additional Guidance continue on the next page

21 cont	Additional Guidance	
	Up to M3 may be awarded for correct work, with no answer or incorrect answer, even if this is seen amongst multiple attempts	
	Yes may be implied eg They receive 5 more than 870	M3A1
	Condone £875.00p and Yes	M3A1

Q	Answer	Mark	Comments
22	100 – 60 or 40 or 360 – 60 – 120 – 100 or 80	M1	oe implied by 1 degree = 0.3 people or 10 degrees = 3 people or 12 customers = 40 degrees
	$\frac{12}{40} \times 360$ or 108 or $\frac{12}{40} \times 60$ or 18 or $\frac{12}{40} \times 120$ or 36 or $\frac{12}{40} \times \text{their } 80$ or 8×3 or 12×2 or $\frac{12}{40} \times (60 + 120 + 100)$ or 84	M1dep	
	24	A1	
	Additional Guidance		
	Up to M2 may be awarded for correct work, with no answer or incorrect answer, even if this is seen amongst multiple attempts		

Q	Answer	Mark	Comments
23	Alternative method 1 – using sine of an angle		
	sin chosen or used	M1	
	$\sin 35 = \frac{14}{x}$ or $x = \frac{14}{\sin 35}$ or $x \times \sin 35 = 14$	M1dep	oe
	[24.4, 25]	A1	
	Alternative method 2 – using cosine of an angle		
	cos chosen or used	M1	
	$\cos 55 = \frac{14}{x}$ or $x = \frac{14}{\cos 55}$ or $x \times \cos 55 = 14$	M1dep	oe
	[24.4, 25]	A1	
	Alternative method 3 – finding adjacent first		
	$\frac{14}{\tan 35}$ or $14 \times \tan 55$ or 19.9(...) or 20	M1	oe
	$\sqrt{(\text{their } 19.9(\dots))^2 + 14^2}$ or $\sqrt{592.(\dots)}$ or $\text{their } 19.9(\dots) \div \cos 35$ or $\text{their } 19.9(\dots) \div \sin 55$	M1dep	oe
	[24.4, 25]	A1	
	Additional Guidance		
	Do not accept scale drawing		
	$\frac{\sin 35}{15} = \frac{\sin 90}{x}$		M1

Q	Answer	Mark	Comments
24(a)	4 or 5	M1	May be implied by 2^3 or 8
	4 and 5 and $\frac{2}{40}$ or $\frac{1}{20}$ or 0.05	A1	May be implied by 2^3 or 8
	Additional Guidance		
	Do not allow exact calculations for M1A1 Eg $9.1039... = 9$ and $5.49 = 5$ and $\frac{2}{45}$		M1A0

Q	Answer	Mark	Comments
24(b)	Valid explanation	B1	eg the numbers on the bottom have been rounded down so that means it will make a larger number when it is divided into the top
	Additional Guidance		
	Ignore irrelevant reasons alongside a correct reason, unless contradictory		
	Ignore a calculation using exact values alongside a correct reason eg 0.05 is greater than 0.040 (...) with valid explanation		B1
	0.05 is greater than 0.040 (...)		B0
	The denominator is larger in the unrounded version		B1
	The denominator is smaller in the estimation.		B1
	2 is divided by more (with answer less)		B1
	Estimating rounds the numbers down which makes the denominator less		B1
	Estimating rounds the numbers down which makes it less		B0

Q	Answer	Mark	Comments
25(a)	$(x + 7)(x - 3)$	B2	either order B1 $(x + a)(x + b)$ where $ab = -21$ or $a + b = 4$
	Additional Guidance		
	Accept $1x$ for x throughout		
	$(7 + x) \times (x - 3)$		B2
	Condone missing final bracket eg $(7 + x)(-3 + x$		B2
	Ignore any attempt to solve $(x + 7)(x - 3) = 0$ eg $(x + 7)(x - 3)$ followed by $x = -7, x = 3$		B2

Q	Answer	Mark	Comments
25(b)	$(y =) 2 \quad (y =) 9$	B1	either order
	Additional Guidance		
	Accept any letter eg $x = 2 \quad x = 9$		B1
	2 and 9 on the answer line		B1
	2 and 9 written separately in the stem unless contradicted by answer line		B1
	2 and 9 written with $(2 - 2)(9 - 9)$ unless contradicted by answer line		B1
	$(2 - 2)(9 - 9)$ on answer line		B0
	$(2 - 2)(9 - 9)$ even if 2 and 9 circled or indicated as the embedded values		B0